UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Pet Techniques and Tracers

2425-3-I0303D036-I0303D063M

Aims

The student will learn the fundamental notions of radiopharmaceuticals used for diagnostic purposes, the related radiochemical, bio-kinetic and bio-distribution characteristics. She/He must know the methods of synthesis, manipulation and use. She/He will also have to learn the history of development and the basic technological characteristics and general operating principles of both CT and MR related positron emission tomography (PET) scanners; will also have to acquire knowledge regarding the PET investigations used to study the pathologies of the various organs or systems, the related acquisition protocols and image processing methods, as well as the basic notions relating to their main indications in the study of oncological pathologies , cardiological, orthopedic, infectious diseases. The student will also have to know PET applications in medical research.

Contents

Fundamentals of Positron Emission Tomography: physical principles, techniques and clinical applications; on radioactive tracers, on detection systems, on the Hot Chamber for the Production of PET Doses and on the organization of a PET centre, on PET radio-pharmaceuticals for diagnostic or research purposes, on PET, CT-PET and MRI-PET tomographs, on oncological and non-oncological PET investigations.

Detailed program

Basic notions: basic notions on the methods of acquisition and reconstruction of PET studies, on quality control, calibrations, corrections (axial and transaxial normalization), on the methods of acquisition and reconstruction of the coincidence time and on the methods of 2D-3D acquisition and reconstruction.
Radiochemistry: the laws, methods of radioactive decay, preparation methods and use of radionuclides and radiotracers in PET.

Radiopharmaceuticals: fundamental notions on the production, biodistribution, bio-kinetics and safety of radiopharmaceuticals used for diagnostic purposes.
Equipment in conventional nuclear medicine and PET: basics of PET, CT-PET and MRI-PET tomography technologies
Techniques and radiopharmaceuticals in positron emission tomography (PET): radiopharmaceuticals, methodological protocols, acquisition techniques and main clinical applications of PET investigations
PET diagnostics: basic notions on the clinical applications of scintigraphic and PET investigations in the oncology and infectious disease field, on the logistical organization of a PET centre. Troubleshooting patient management and image quality issues.

Prerequisites

Teaching form

6 frontal lessons of 2 hours carried out in attendance

Textbook and teaching resource

The Teacher will provide educational materials

Semester

First semester

Assessment method

5 multiple choice questions and oral exam

Office hours

By appointment required by mail

Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION